

FIGURE 2



Speckled snow mold, caused by *Typhula ishikariensis*, causes severe damage in areas with snow cover greater than 90 consecutive days. At this course in Michigan's Upper Peninsula, where disease pressure is extreme, a "clean up" fungicide pass is made to protect the rough closest to the fairway while anything unsprayed is severely infected.

control because there are many effective options. One place to turn for help is university research, which is an independent means for determining what products are going to be effective. Several different universities across the country conduct fungicide research on snow mold, and here at the University of Wisconsin we have conducted snow mold fungicide efficacy trials at golf courses in Wisconsin, Minnesota and the Upper Peninsula of Michigan for years. The full list of all of our snow mold efficacy reports over the years, along with treatment pictures, can be found on the Research page of the Turfgrass Diagnostic Lab's website

([www.tdl.wisc.edu/Research.php](http://www.tdl.wisc.edu/Research.php)).

When looking at our trial results over the years the treatments generally can be separated into three groups: (1) those treatments that manage snow mold extremely well even under heavy disease pressures; (2) those treatments that significantly reduce snow mold severity but oftentimes allow some disease to develop; and (3) those that do not effectively manage snow mold.

As evidenced in research conducted during the winters of 2010-2011 (Figure 4) and 2012-2013 (Figure 5), those treatments most effective at managing snow mold often contain three or even four active ingredients. These

active ingredients often are a mixture of different physical modes of action (contact, penetrant, etc.) and chemical modes of action (strobilurin, DMI, etc.). This mix provides the best opportunity for your treatment to survive exposure to the harsh winter elements over a period of two, three or four months or longer.

Which treatments have proven to be the most effective under heavy snow mold pressure? Based only on our own research here at Wisconsin, products that have consistently performed well over a number of years under heavy pressure include Instrata (chlorothalonil+propiconazole+fludioxonil),

Continued on page 42

**FIGURE 3**



Microdochium patch, also called pink snow mold, doesn't actually need snow cover to develop and will develop any time conditions are cool and wet. But the most severe symptoms usually develop following snow cover on unfrozen ground, as evidenced at this course in the Rocky Mountain West.

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Interface (iprodione+trifloxystrobin) + Triton FLO(triticonazole), Insignia SC(pyraclostrobin) + Trinity (triticonazole), Torque (tebuconazole) + 26/36 (iprodione+thiophanatemethyl), and Quali-Pro TM/C (chlorothalonil+thiophanatemethyl) + QP Ipro (iprodione) + QP Propiconazole (propiconazole). You will probably notice that each one of these treatments includes at least three active ingredients, and some contain four. You will also probably notice that Syngenta, BASF, Bayer, NuFarm, and Quali-Pro are all represented in this list. That is not coincidental; each company has treatments that can effectively manage snow mold. How do you choose among these, you may ask? That

will likely depend on the program's cost and who you're most comfortable working with. But the point is clear: You have options when choosing an effective snow mold fungicide.

### **TIMES ARE TIGHT, ARE THERE ANY LOWER-COST OPTIONS?**

While the products listed above are certainly effective, they also can be costly. That is especially true when considering protecting acres of fairways. Based on an analysis I completed in 2011, protecting 30 acres of fairways with the treatments listed in the previous section can cost anywhere from \$8,500 to over \$15,000.

But what if your course doesn't require disease-free fairways every spring? Or what if snow mold pressure at your location is generally pretty light?

Are there lower cost options that may not completely control snow mold but still provide some level of protection?

Fortunately, the answer is yes. Using the results obtained from our research over the years, there are several options for affordable snow mold reduction (Figure 6). All six of the treatments listed in Figure 6 were below \$10,000 for 30 acres of coverage in 2011 prices. Torque and Trinity were just more than \$3,000 for 30 acres, and Turfcide 400(PCNB) was closer to \$1,000. It's important to note that fungicide prices vary considerably due to a number of factors and that these prices are from 2011. But it still gives a general picture of affordable yet effective options. It's also important to note that these treatments aren't likely to give you complete snow mold control.

All the treatments shown in Figure 6 reduced snow mold to less than 10 percent, an acceptable level on many fairways. However, if you're looking for much less than 10 percent snow mold control, I would recommend a more diverse mixture of compounds similar to those listed in Figures 4 or 5. It's also important to note that this analysis was only done on treatments that were included in our research at Wisconsin, and there are several other compounds (not to mention generic fungicides) not included in our research that can provide an affordable reduction in snow mold severity at your course.

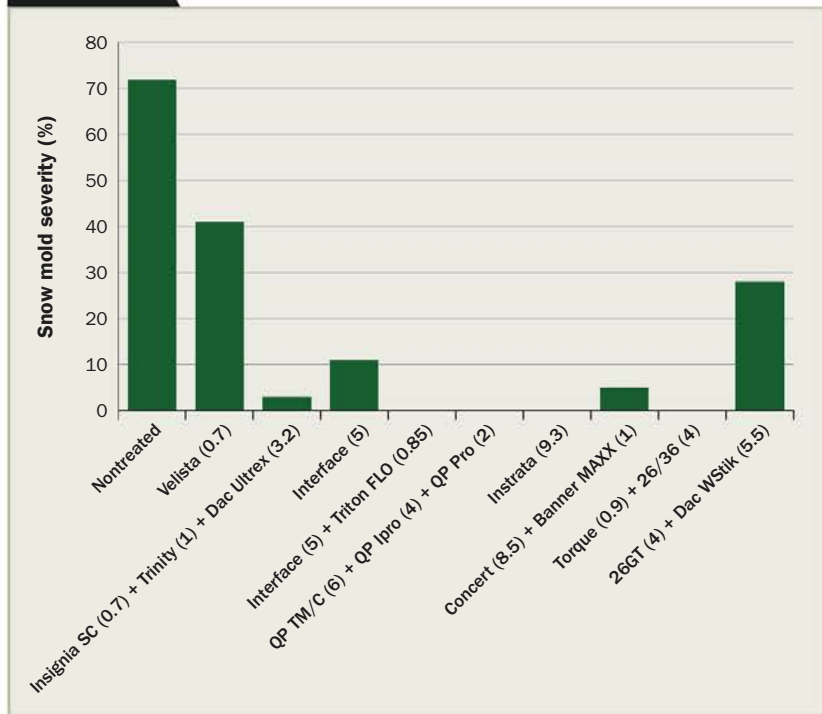
**THE INTANGIBLES**

It should be pretty clear by now that options for effective snow mold management are plentiful. That reality has led superintendents to look at aspects in addition to disease control to help them make their decisions. Since many products are priced competitively, the other intangible that can help sway a purchaser's decision is turf color. That is certainly nothing new to the turf fungicide market, as fungicides promoting improved turf color, health and stress tolerance are heavily marketed for summer fungicide applications. More recently, however, superintendents have been looking toward their snow mold fungicide applications to improve the color of the golf course coming out of snow melt the following spring.

Bayer's Stressgard pigments long have been a part of fungicides geared toward summer diseases but are now also included in products such as Interface that are primarily intended for snow mold. Other pigments such as Foursome by Quali-Pro and PAR by Harrell's also have been included in snow mold research here at Wisconsin the past few years, and the turf is significantly greener the following spring. Civitas (mineral oil), which includes the green pigment Harmonizer, has not

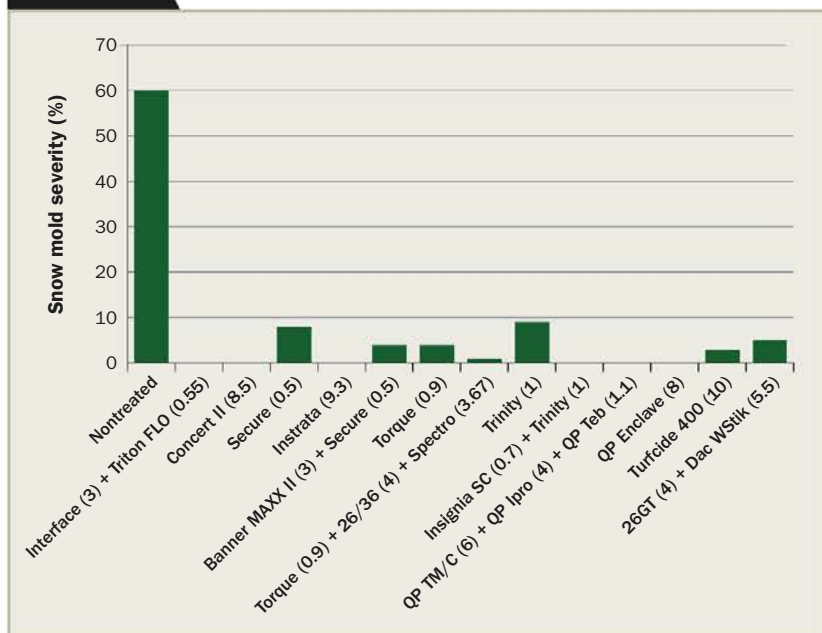
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**FIGURE 4**



Comparison of a select number of treatments for speckled snow mold management at Sentryworld GC in Stevens Point, WI in the winter of 2010-2011. Fungicide rate in fluid ounces per 1,000 ft<sup>2</sup> is in parentheses. For the full trial results visit [www.tdl.wisc.edu/Research.php](http://www.tdl.wisc.edu/Research.php)

**FIGURE 5**



Comparison of a select number of treatments for speckled snow mold management at Wawonowin CC in Champion, MI in the winter of 2012-2013. Fungicide rate in fluid ounces per 1,000 ft<sup>2</sup> is in parentheses. For the full trial results visit [www.tdl.wisc.edu/Research.php](http://www.tdl.wisc.edu/Research.php)

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 provided acceptable snow mold control in most of our trials at Wisconsin but has provided exceptional green color the following spring (Figure 7). This green color fades rapidly as the turf comes out of dormancy, but superintendents

looking for any advantage they can get in difficult early spring conditions may find the brief green-up beneficial.

### THE FINAL WORD

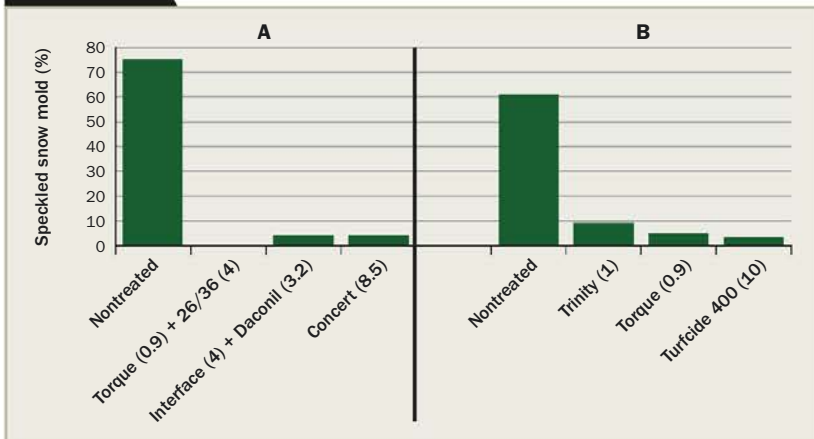
If options are what you crave in life, then choosing a snow mold fungicide

program should leave you drooling. Too many effective options exist for me to list just a few, and what may work well for one facility may not quite fit with another facility for a number of reasons. The best recommendation I can give is to use the research provided by university efficacy trials to determine what products are effective in conditions similar to yours. Take these products and discuss pricing and other intangibles with a sales or technical representative you're comfortable with, and come up with a plan for effective and affordable management of snow mold at your course. Then sit back and rest easy for the winter...unless ice starts to form.

*Author's note: Listing of specific products in this article is based on research conducted at the University of Wisconsin and is not intended to be an endorsement of the product or of the manufacturer.*

Paul Koch, Ph.D., is a research scientist at the University of Wisconsin-Madison. Contact him at [plkoch@wisc.edu](mailto:plkoch@wisc.edu).

**FIGURE 6**



Efficacy of lower-cost options for control of speckled snow mold (*Typhula ishikariensis*) at (A) Sentryworld GC in Stevens Point, WI in 2010-2011 and (B) Wawonowin CC in Champion, MI in 2012-2013. Fungicide rate in fluid ounces per 1,000 ft<sup>2</sup> is in parentheses.

**FIGURE 7**



Civitas combined with Harmonizer, in addition to several other turf pigments and pigmented turf fungicides, applied in the fall can produce dramatically "greener" turf the following spring compared to non-treated turf. This photo was taken five months after the application on March 15th, 2012, in Madison, WI.

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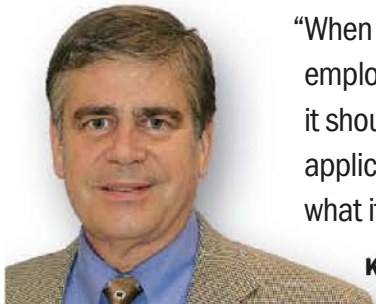
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“When an employer looks at a prospective employee who has worked on a golf course, it should immediately register that the applicant is not afraid to work and does what it takes to get the job done.”

**KARL DANNEBERGER, PH.D.**, *Science Editor*

## A special summer job

**F**or many high school and college students, having a summer job helped pay for school, a car or just a night out. Unfortunately, most students who had a job this past summer had little beyond pay to add to one’s résumé. ¶ Those who worked on a golf course maintenance crew, however, were able to add the experience to their résumés, and it spoke volumes about their character. What did it say? Here are a few things that come to mind:

**1 “I work hard.”** When I have visited golf courses, students working on the crew are able to save quite a bit of money because they often don’t have time to spend it. It’s common for staff to work over 50 hours a week. And in some cases, especially around tournaments, a 100-hour week is not uncommon. When an employer looks at a prospective employee who has worked on a golf course, it should immediately register that the applicant is not afraid to work and does what it takes to get the job done.

**2 “I’m dependable.”** If you are employed on a golf course, showing up late usually means being fired. It is the same thing when a company or golf course asks if a prospective

employee shows up on time to class. Dependability speaks to a student’s enthusiasm and interest in the job.

**3 “I pay attention to detail.”** A student is exposed daily to the importance of the small things that go into the presentation of a golf course. For example, the importance of mowing straight lines, whether on greens or fairways; how equipment is cleaned and stored after use; or raking a bunker properly.

**4 “I’m responsible.”** Students are required to operate technically advanced equipment, including mowing equipment ranging from \$7,000 to \$70,000 in value. For a potential employer, that speaks to an em-

ployee’s willingness to learn, adapt and take responsibility.

**5 “I communicate effectively.”** Students are continually questioned by golfers about what they are doing and why. How many times across all the golf courses in the United States do golfers ask, “Digging for worms?” when someone is trying to fix an irrigation leak? An employee has to be able to address questions in a friendly tone and concise manner (even if they don’t feel like it) so not to offend the golfer and slow the pace of play. For many golfers the only contact they have with course officials is through a question or comment to a grounds staff person.

This is just a small list of attributes that an employer could surmise from a potential employee who has worked on a golf course. I am sure many of you could add to the list.

If I were a potential employer, in any line of business, wading through a stack of résumés, an applicant who had successfully worked on a golf course maintenance crew would stand out. That experience would tell me that the applicant could handle hard work and long hours. That experience would tell me more about the character of the applicant than grade point average or outside activities.

So to all of you who are working on a golf course maintenance staff this summer, don’t think about how hot and tired you are or the long hours that kept you away from social activities. Rather, think about what all you have learned and how you can apply it to your future.

Karl Danneberger, Ph.D., *Golfdom’s* science editor and a professor at The Ohio State University, can be reached at [danneberger.1@osu.edu](mailto:danneberger.1@osu.edu).

# All things water and irrigation

**A**fter a long, hot summer during which your irrigation system has been tested, it's time to assess all things related to water and irrigation. Do the assessment now. The evidence — turfgrass performance — is right in front of you, and the experiences of summer are still fresh in your mind.

## TURFGRASS PERFORMANCE

Did the turfgrass meet the demands of golfers? Did the irrigation management help achieve the performance criteria established for the golf course? Identify wet and dry areas. Devote time to figure out why these areas were wet or dry and formulate a plan to correct these shortcomings this fall.

Check the distribution of water to make sure it is as uniform as possible. Conduct a catch-can analysis so you have data to help plan your actions. The uniformity data also can be used to make an effective case for irrigation system upgrades.

## IRRIGATION SUPPLY

Now is the time to assess the reliability of your irrigation supply and ensure you received the volume of water you expected. Talk with your water provider to understand their situation. At the end of the summer, your water provider will have the best handle on the current situation and can offer thoughts on the water supply for next year.

Get your water tested by a reputable testing lab. In late summer, water quality is generally at its worst, due to the low volume of water in rivers,

**“In late summer, water quality is generally at its worst, due to the low volume of water in rivers, streams, lakes and reservoirs.”**

streams, lakes and reservoirs. Low volume means that salts are most concentrated, so now is the best time to test water.

Have you identified a back-up water supply in case something unforeseen happens to the primary water supply? While this is easier said than done, it is critical that you have a back-up supply or a large amount of water storage capacity onsite to get you through an emergency.

Routine, preventive maintenance on your pump station is always a good idea. So is a thorough inspection of your irrigation system. Make sure every sprinkler head is level, free of obstructions and performing at its best. Do it now, before fall settles in and

your attention will have to be devoted to other projects.

Did you record water use during the irrigation season? In some locations recording water use is a requirement. If it is not a requirement, you should still record water use on a daily basis so you can become a more efficient water user. Also, hard data to support your claims about water use is invaluable. Without data, it is just your word against theirs.

## PRIORITIZE WATER USE

Do you have a written priority system for which areas of the golf course will be watered and which will not? If you don't have an established written priority system, prepare it now while you can show the leaders of the golf club what the turf looks and plays like near the end of the period when the irrigation system is used the most. Seeing turf conditions will make developing the policy easier.

If you have a written priority system for water use, was it effective? Did the highest priority areas receive all the water needed? How did the golf course play? Make changes to the water priority policy now while all the golfers can see the impact of the previous policy and the value of the changes.

While cooler weather and football might be on your mind, use the results of the 2013 irrigation season that are right in front of you to make improvements for 2014.



Clark Throssell, Ph.D., loves to talk turf. Contact him at [clarkthrossell@bresnan.net](mailto:clarkthrossell@bresnan.net).

# Professional Grade

NEW PRODUCT HIGHLIGHTS // **DOLLAR SPOT CONTROL**

## X MARKS THE DOLLAR SPOT

GOLFERS DON'T CARE WHAT IT IS, THEY JUST KNOW IT LOOKS BAD.

**KEN MOUM** // Contributing Editor

### 1. Secure

**SYNGENTA** Designed to be the ideal rotation partner with Daconil Action fungicide, the multi-site mode of action in Secure helps deliver season-long protection against the toughest turf diseases. Now, systemic fungicides no longer replace superintendents' contact applications, but rather compliment for inside-out protection.

The only registered fungicide for turf in FRAC group 29, Secure contains the active ingredient fluzinam. It has no known resistance and as a multi-site contact, it has a low risk of future resistance.

Secure also controls 10 additional turf diseases. [greencastonline.com/Secure](http://greencastonline.com/Secure)

### 2. Curalan EG

**BASF'S** Curalan EG offers economical, effective dollar spot control in cool- and warm-season turfgrasses with strong preventative protection and long residual results and significant cost savings compared to many other fungicides.

It controls dollar spot and eight other diseases including brown patch, leaf spot and melting out. It is safe to use on all cool- and warm-season grasses at any stage of growth. It also makes an excellent tank-mix

**DOLLAR SPOT IS A WIDESPREAD AND DESTRUCTIVE TURFGRASS DISEASE** caused by *Sclerotinia homoeocarpa* that can be found year-round in the United States. It is known to attack most turfgrass species including annual bluegrass, bentgrasses, fescues, Kentucky bluegrass, perennial ryegrass, bermudagrasses, zoysiagrasses, centipedegrass and St. Augustinegrass. Here are just a few products to help you fight back against it.

partner with strobilurins. [betterturf.basf.us](http://betterturf.basf.us)

### 3. Eagle

One application of **DOW AGRO EAGLE** will deliver up to 21 days of disease control. So, whether you apply it on a 14-, 21- or 28-day spray schedule, it allows maintenance staffs to make the most of their time by providing long-term disease protection when it's needed most.

Dow Agro recommends using Eagle in a tank mix or treatment rotation strategy with other broad-spectrum fungicides to provide maximum control of a wide variety of diseases.

[dowagro.com/turf/](http://dowagro.com/turf/)

### 4. Fungicide IX

**ANDERSON'S** combines chloroneb and thiophanate-methyl to prevent and control dollar spot, gray snow mold, pink snow mold, *Pythium Blight*, brown patch and copper spot.

Suitable for use on all putting green turf and other turfgrasses, including bentgrass, bluegrass, bermudagrass, fescue, ryegrass and St. Augustinegrass, it provides fast-acting, sustained

disease control through root and foliage uptake, resulting in less susceptibility of product to weather and maintenance conditions.

[andersonspro.com](http://andersonspro.com)

### 5. Triton 70 WDG

Chipco Triton 70 WDG from **BAYER** is a water-dispersible granular product containing the active ingredient triticonazole that provides broad-spectrum, systemic, residual disease control of key turf diseases, such as dollar spot, anthracnose and brown patch.

When applied as a preventative treatment the new fungicide product has provided excellent results in research trials conducted at both universities and golf courses, on both residential and commercial turf.

[backedbybayer.com](http://backedbybayer.com)

### 6. Daconil Action

**SYNGENTA'S** Daconil Action contains the most utilized active ingredient in turf: chlorothalonil. But it adds acibenzolar-s-methyl — a turf protein booster. This has no direct effect against pathogenic fungi and bacteria, instead it triggers the natural defense re-

## TIPS FROM DR. DANNEBERGER

- Cultural practices to reduce disease severity center on soil/leaf moisture and nitrogen fertility. Prolonged periods of wetness when temperatures are favorable are conducive for disease symptoms.
- To reduce disease severity try practices that help reduce leaf wetness, including dew removal through a light morning syringe or whipping or dragging the turf. This would be especially helpful on the days fairway mowing is not done.
- For greens, rolling after mowing has been reported to reduce the incidence of dollar spot.



**SECURE<sup>®</sup>**  
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6

**Curalan<sup>®</sup> EG**  
Fungicide

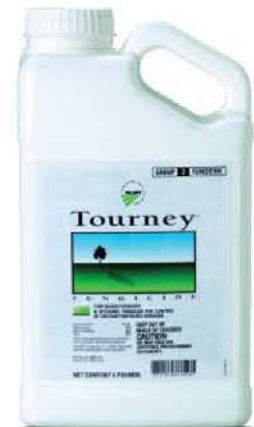
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5

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FUNGICIDE

8



9

sponse or activating production of pathogenesis-related proteins, like a vaccination.

The protein boost awakens the turf's resistance to biotic and abiotic stresses like drought. This internal response within the plant enhances its defense system against certain fungal and bacterial disease attacks. While the chlorothalonil provides excellent protection as a multi-site fungicide on the plant surface, acibenzolar-S-methyl achieves broad plant coverage.

[greencastonline.com](http://greencastonline.com)

**7. 3336**

**CLEARY** offers its 3336 fungicide in a number of versions, including flowable, wettable powder and granular. They also offer a greens grade, sand core granular

product specifically formulated for greens and tees on golf courses.

The latest addition to the line is a collaboration with The Andersons, Inc. a co-marketed, 3336 G with The Andersons patented DG Lite technology. The product is marketed under the Cleary brand and is distributed through The Andersons, Inc. and Cleary Chemicals LLC. [clearychemical.com](http://clearychemical.com)

**8. Emerald**

Emerald from **BASF** can effectively control dollar spot that has developed resistance to other fungicides. When used as directed it provides dollar spot control for up to 28 days in virtually every major turf species, and in every region, of the U.S.

The active ingredient boscalid deprives the fungal

cells of energy, disrupting fungal growth and development. Because the mode and site of action differ from other fungicides used to control dollar spot, it can effectively control pathogens that have developed resistance to other fungicides. [betterturf.basf.us](http://betterturf.basf.us)

**9. Tourney**

**VALENT'S** Tourney is one of the most active fungicides on the market for effective control of a spectrum of tough diseases, including dollar spot, anthracnose, brown patch, summer patch, take-all patch, fairy ring, necrotic ring spot, gray leaf spot, snow mold and other patch diseases.

For early season dollar spot control and early application, it reduces the primary inoculum level of the

dollar spot pathogen, which delays the development of an epidemic until midsummer. [valent.com/professional/golfcourse](http://valent.com/professional/golfcourse)

**10. Enclave**

**QUALI-PRO'S** Enclave, featuring quad-control technology, controls major turf and ornamental diseases, including dollar spot, brown patch, anthracnose and snow mold. It provides control at the point of contact as well as systemically. Its synergistic formulation prevents and controls disease through multi-site activity. [quali-pro.com](http://quali-pro.com)



**CONTINUED ONLINE**

For more listings of top Dollar Spot Control products, go to [golfdom.com/DollarSpot](http://golfdom.com/DollarSpot)

## 1. Annuity

Annuity (FLRS) Turf-Type Annual Ryegrass offers faster establishment and better transition in spring/summer according to **SEED RESEARCH OF OREGON**.

It has a finer leaf texture and darker green color than other turf-type annual ryegrasses. Can be combined with perennial and transitional ryegrasses for winter overseeding.

[sroseed.com](http://sroseed.com)

## 2. Hollywood

Hollywood bermudagrass from **JACKLIN SEED**, although it has a limited seed availability, its fine leaf texture, dark green color, especially winter color in the southwest, quick spring green-up make it ideal for a wide range of applications.

[jacklin.com](http://jacklin.com)

## 3. North Shore SLT

North Shore SLT bermudagrass from **ROSE AGRI-SEED** will be available this fall and offers excellent drought, heat, salt and wear resistance with a medium-fine leaf texture and medium-dark green color. It greens up early in the spring and offers excellent fall color retention. Best in full sun.

[pureseed.com](http://pureseed.com)

## 4. Pure Select

Pure Select creeping bentgrass from **TEE-2-GREEN CORP.** will be available this fall in limited quantities. Thanks to its dense and aggressive growth habit, it recovers quickly from wear. Has exceptional resistance to brown patch, dollar spot, microdochium patch, fusarium patch, leaf spot and anthracnose.

[tee-2-green.com](http://tee-2-green.com)

## 5. TransFix

TransFix (46-09 IR-SAS) transitional ryegrass from **SEED RESEARCH OF OREGON** is available this fall. It has a darker green and finer textured variety compared to perennial ryegrass. Its improved germination in low soil temperatures, fast germination and establishment, make it a superior nursery grass or for quick repairs.

[sroseed.com](http://sroseed.com)

## 6. Transist 2600

Transist 2600 transitional ryegrass from **PICKSEED** offers rapid germination and establishment making it a good fast-starting turf cover over dormant bermudagrass. Much darker green and finer texture than other intermediates and annuals. Excellent tolerance to high salt levels.

[pickseed.com](http://pickseed.com)

## 7. Artesia & Waterworks

Artesia and Waterworks Kentucky bluegrass from **TURF MERCHANTS** is available after the 2013 harvest. Qualified a drought tolerant by the Turfgrass Water Conservation Alliance. Compact American type bluegrass



with dark color and medium texture.

[turfmerchants.com](http://turfmerchants.com)

## 8 Amazing A+

Amazing A+ (IS-PR 463) perennial ryegrass from **AMPAC SEED CO.** offers superior overall turf quality, dark green genetic color, salt tolerance, improved spring green-up, dense upright growth, improved disease resistance including exceptional gray leaf spot resistance.

[ampacseed.com](http://ampacseed.com)

## 9. Green Supreme

**AMPAC'S** Green Supreme perennial ryegrass offers excellent spring green-up and traffic tolerance with dense upright growth habit. It is salt and drought tolerant.

[ampacseed.com](http://ampacseed.com)

## 10. Wicked

Wicked perennial ryegrass from **PICKSEED** will germinate in salt levels as high as 12,000 ppm while offering excellent disease resistance and specific resistance to gray leaf spot. It greens up early in the spring, with good summer persistence and heat resistance.

[pickseed.com](http://pickseed.com)

## 11. Blade Runner II

**PICKSEED'S** Blade Runner II (PSG 85QR) tall fescue has improved spreading via rapid tillering and rhizome production. It will germinate in salt levels up to 14,000 ppm, has broad geographical adaptation and excellent resistance to heat and drought stress.

[pickseed.com](http://pickseed.com)

## 12. ATF1258 & ATF1376

**PENNINGTON'S** ATF1258 and ATF1376 tall fescues are both qualified as drought tolerant by the Turfgrass Water Conservation Alliance. And they offer very good brown patch resistance and very good turf quality with good genetic color.

[penningtonseed.com](http://penningtonseed.com)

## 13. Sea Fire

Available this fall, **COLUMBIA SEEDS'** Sea Fire slender creeping red fescue is tolerant of salt, heat and drought with improved mowability.

[columbiaseeds.com](http://columbiaseeds.com)



**CONTINUED ONLINE**

For more listings of top seeds, go to [golfdom.com/Seed](http://golfdom.com/Seed)